ROSWELL DISTRICT

WILDERNESS

FINAL ENVIRONMENTAL ASSESSMENT

APPENDIX 1: WILDERNESS ANALYSIS REPORT

U.S. Department of the Interior
Bureau of Land Management
Roswell District
New Mexico
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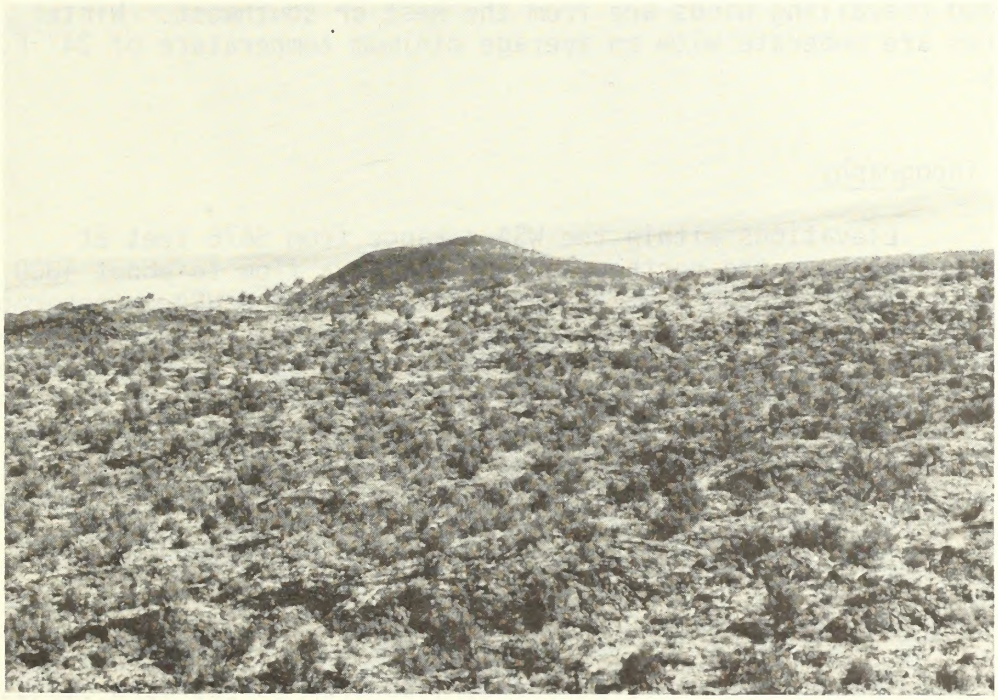
This report was prepared to describe the resources, human uses and resource conflicts that were analyzed by the Bureau of Land Management (BLM) in order to develop management recommendations for two Wilderness Study Area s (WSA s). The two WSA s were previously identified during BLM's wilderness inventory process as Little Black Peak WSA and Carrizozo Lava Flow WSA. Normally, a single report is prepared for each WSA - however, due to the similarities and common boundary of these two areas a combined report was prepared to minimize repetitive narratives. Any differences between the WSA s are described in subsequent sections of this report. If no distinction between areas is made in a narrative it can be assumed to apply to both WSA s.

I. GENERAL DESCRIPTION

A. Location

Little Black Peak and Carrizozo Lava Flow WSA are located in the northeast arm of the Tularosa Basin near the western border of Lincoln County, New Mexico. These WSA s are administered by the Roswell Resource Area of Roswell District, Bureau of Land Management.

The WSA s consist of about the northern third of the Carrizozo "Malpais" (a Spanish word meaning "badlands") - an extensive lava flow on the valley floor west of Carrizozo, New Mexico. This lava flow originated from fissures near Little Black Peak cinder cone, a prominent geographic feature for which the northern WSA was named.



LITTLE BLACK PEAK, AN 85-FOOT HIGH CINDER CONE, MARKS THE SPOT WHERE THE CARRIZOZO MALPAIS ORIGINATED.

South of U.S. Highway 380, which forms a common boundary between the study areas, the Carrizozo Lava Flow WSA extends southwesterly for about 7 miles. The total length of the lava flow is about 44 miles of which 14 miles are under consideration for potential wilderness designation. The WSA's are located on three 15 minute series topographic maps published by the U.S. Geological Survey; Carrizozo, Chihuahua Ranch and Little Black Peak. WSA boundaries and their approximate location in southcentral New Mexico are shown on the map included at the end of this chapter.

B. Climate and Topography

Climate

The portions of the Carrizozo Malpais that are being evaluated for wilderness suitability are influenced by a considerable variation in precipitation. The northern end of the flow receives about 14 inches of precipitation contrasted with about 11 inches at the south end. The decline in precipitation is gradual within the 14 mile horizontal distance of both WSA s. This difference in precipitation between the northern and southern ends of the WSA s is believed to be due to a 700 foot reduction in elevation, and due to the "rain shadow" effect of the nearby Oscura Uplift which blocks the movement of moisture laden clouds to the southern part of the WSA's.

The arid climate of the WSA s is characterized by a hot summer season (90 to 95 degrees F. in July) during which most of the annual precipitation is received as rainfall. The average growing season is 190 days and prevailing winds are from the west or southwest. Winter temperatures are moderate with an average minimum temperature of 24° F. in January.

Topography

Elevations within the WSA s range from 5676 feet at Little Black Peak near the northern end of the lava flow to about 4000 feet at the southern boundary of the Carrizozo Lava Flow WSA. Topography and land form of the lava flow was strongly influenced by the southerly trending gradient of the valley floor. The flow appears to be relatively level when viewed from a distance. However, the surface of the flow is extremely rough and broken due to the presence of fractures, collapsed lava tubes and pressure ridges. There are no major water drainages within the lava flow since external water courses either disappear under or flow along the lava's edge for short distances. A low range of limestone hills are located on the western edge of the Carrizozo WSA.

C. Land Status

Based on acreage calculations derived from Bureau land status records, Little Black Peak WSA contains 15,072 acres under federal

surface and subsurface ownership. There is one non-federally owned inholding of 640 acres of New Mexico state trust land (surface and subsurface) located inside the WSA boundary.

Carrizozo Lava Flow WSA contains 10,240 acres, surface and subsurface federal ownership. There are no inholdings within this area since the WSA boundary conforms with property lines and manmade intrusions located on federal lands.

The boundary lines and land status for both WSA s are depicted on Map 1 at the end of this chapter. WSA boundaries were established during the inventory phase of BLM's wilderness review program which was completed in November 1980. WSA acreages used in this report are more precise than previous computations, and therefore are different than previously published acreage figures.

D. Access

Both WSA s are physically and legally accessible by overland foot travel from U.S. 380 along their common boundary. Permanent legal access for vehicles is not available from other locations since there are no public roads that enter the WSA. However, temporary legal access from Lincoln County Road D002 is available across state land (Section 2, T. 6 S., R. 9 E.) at the northwest end of Little Black Peak WSA. This legal access is temporary in that it is available only during established hunting seasons for protected game animals, and access rights are restricted to licensed hunters. Physical access to the WSA's across adjoining non-federal lands may be available at the discretion of adjoining land owners.

MAP I-1

Little Black Peak (060-109) and Carrizozo Lava Flow (060-110A-1) WSA's

Legend

WSA BOUNDARY

AMENDED BOUNDARY **(darker area excluded)**

Land Status*

BLM

PRIVATE **(NONE)**

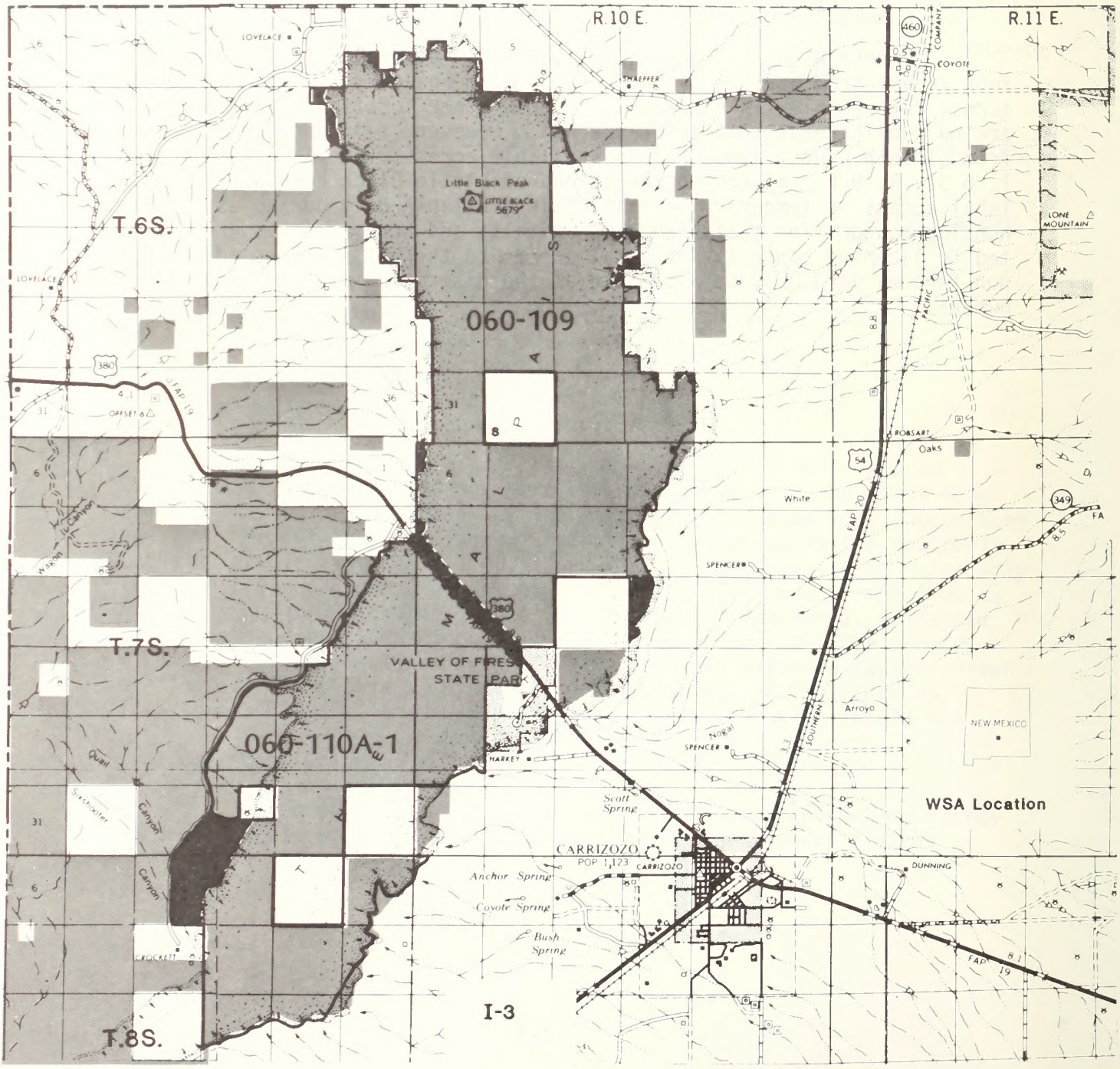
STATE

N

Scale: 1/2 inch=1 mile

* Non-BLM ownership is identified only inside the WSA's boundary.

Source: USDI BLM, Roswell District, 1982



II. EXISTING RESOURCES

A. Geology

1. Geologic Structure

The Carrizozo Malpais is believed to be one of the youngest lava flows in the continental United States and is estimated to be less than 1500 years old. This young age is indicated by the flow's fresh and uneroded appearance, and the extremely dark tone evident on high altitude satellite imagery. The lava flow in the WSA s was formed during two different volcanic episodes and both layers of lava can be detected in the area north of Little Black Peak and at a deep sinkhole in the southern WSA (Section 24, T. 7 S., R. 9 E.).

THIS 20 ACRE DEPRESSION IN THE CARRIZOZO LAVA FLOW WSA CONTAINS A DEEP SINKHOLE THAT CUTS THROUGH 160 FEET OF LAVA INTO THE UNDERLYING VALLEY FLOOR.

According to available information, the majority of the upper and most recent lava flow is included within the WSA's. The age of the Upper Carrizozo flow has not been established through any reliable method such as potassium-argon dating and age estimates are based on the fresh appearance of volcanic features.

The flow exhibits all the features commonly associated with recent flows of basaltic composition, such as flow units, pressure ridges, collapsed lava tunnels and "kipukas" (a Hawaiian term for older rocks surrounded as islands by lava). The upper surface of the flow is highly porous due to gas bubbles that escaped during the last stages of cooling. In places it is sufficiently spongelike in texture to be termed scoria. Of the two contrasting surface textures which develop on flows, the surface of this flow is commonly known by its traditional Hawaiian term "pahoehoe" (or ropy) which has a twisted and convoluted surface.

PAHOEHOE, A ROPY TEXTURED FORM OF LAVA, IS A COMMON FEATURE OF THE CARRIZOZO MALPAIS IN BOTH WSA S.

The recent Pliocene age lava flow overlays older sedimentary rocks of the Permian age Yeso, San Andres, and Artesia Formations; Triassic age Chinle Formation ; and the Cretaceous age Dakota Sandstone and Mancos Shale Formations. All of the sedimentary formations have been tilted and appear at greater depths to the southeast. A small deposit of intrusive rock (molten rock that cooled below the surface) is exposed on the crest of the largest kipuka located at the southeast corner of Little Black Peak WSA.

2. Minerals

The primary source for mineral information used in this study report is from a document entitled "Geology, Energy and Mineral Resources Assessment in the Carrizozo Area, New Mexico". This document, referred to in abbreviated form as the GEM assessment, was contracted by BLM to supplement available information about mineral potentials in the WSA's. The GEM assessment may be inspected at the Roswell Resource Area office.

The GEM assessment indicated that, based on an analysis of existing information, there is no known mineral deposit or potential mineral occurrence in the WSA's that has more than a low favorability rating for development. Favorability ratings were based on an evaluation of the geologic environment, inferred geological processes and economic or technological constraints to resource development. The following mineral commodities and associated geologic environment were evaluated in the GEM assessment:

1. Replacement iron in intruded sedimentary rocks;

2. Hydrothermal gold, silver, copper, lead, zinc, fluorite, barite and porphyry molybdenum-copper in intrusive rocks;

3. Uranium in limestone and igneous rocks;

4. Stratabound copper-silver, and salt in the Yeso Formation;

5. Oil and gas in Paleozoic rocks;

6. Geothermal resources in volcanically active basalts;

7. Sand and gravel in alluvial deposits;

8. Gypsum in sedimentary formations;

9. Scoria, basalt and crushed rock sources.

There is no information that indicates any favorability for coal, vermiculite and placer gold to occur in the WSA s, even though these minerals are found in nearby areas.

B. Water

There are no perennial water sources in the WSA and surface water is only available for short periods following a heavy rainfall or sudden snow melt. When surface runoff does occur the water flows from the surrounding areas into the lava and infiltrates into the ground. Surface precipitation within the lava flow either evaporates or travels a short distance and infiltrates.

Ground water in the area adjacent to the lava flow occurs from approximately 90 to over 500 feet in depth. Due to high salinity the water quality is marginal for human consumption, but it is suitable for livestock and wildlife. Total dissolved solids in the ground water range from 1,000 to 3,000 mg/L.

Water usage in the WSA is low and most consumption is made by livestock and wildlife from available surface water.

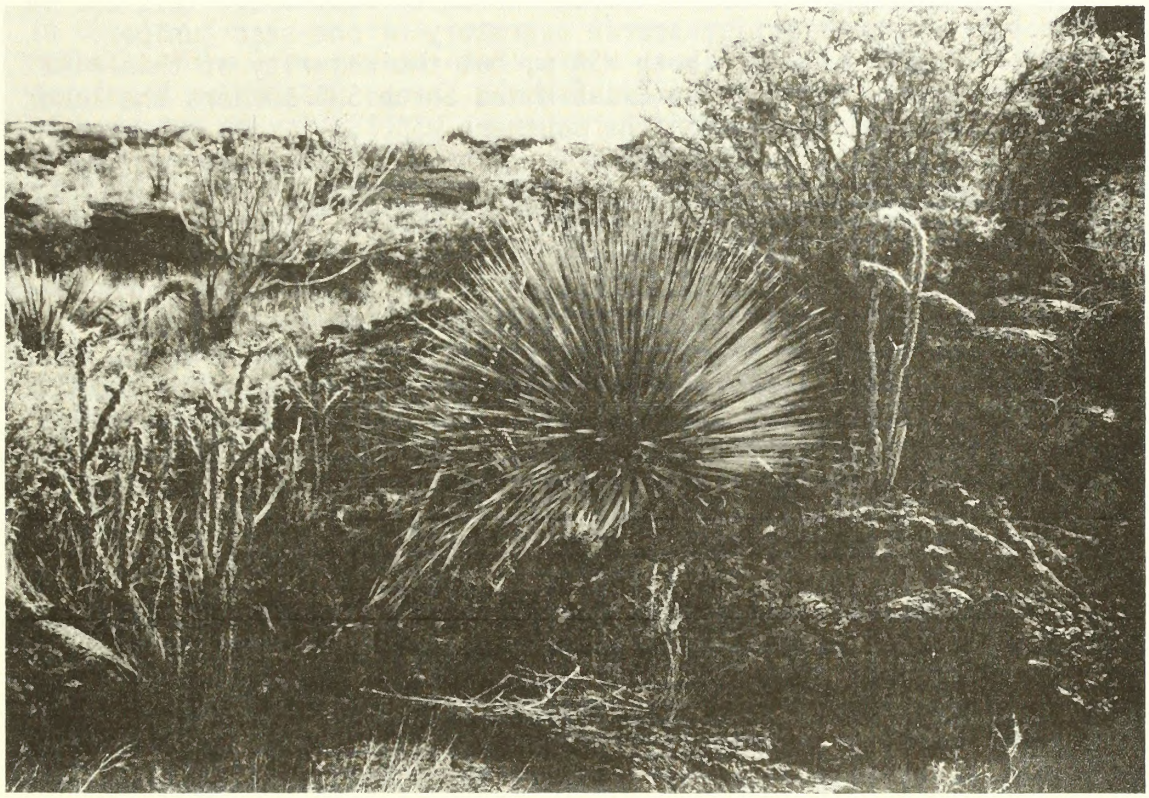
C. Soils

Six soil map units occur in the WSA area as mapped in the Lincoln County Area soil survey report. The majority of the WSA is shown as a lava flow map unit, which by definition is not considered a soil but is a land type describing the rocky lava flows. Some wind and water borne soil has been deposited in cracks and crevices in the lava which supports vegetative growth. Water and wind erosion hazards in the lava flow map unit are negligible.

The other five soil map units occur along the boundary of the lava flow and include the following soil series; Rance, Tanbark, Tortugas Andergeorge, Darvey, Asparas, Harvey and Gabaldon. These soils are not extensive within the WSA because the boundary closely follows the edge of the lava flow. Rance and Tanbark soils have a high wind erosion potential. Tortugas soil has a high water erosion hazard and a slight wind erosion potential. Andergeorge, Darvey, Asparas, Harvey and Gabaldon soils have a moderate water erosion hazard and a high wind erosion potential.

D. Vegetation - T & E Species

In comparison to surrounding areas the Carrizozo Malpais supports a remarkably diverse and luxuriant flora, 114 species exclusive of grasses compared to 51 species on the surrounding areas (Shields 1956).



ALTHOUGH THE CARRIZOZO MALPAIS IS BELIEVED TO BE A VERY RECENT VOLCANIC AREA, A DIVERSE COMMUNITY OF DESERT SHRUBS AND GRASSES HAS BECOME ESTABLISHED.

Both WSA's are within the Upper Sonoran Life Zone. Vegetation composition is primarily affected by a north-south elevation and precipitation gradient, with the north end being higher and wetter and, as a result, supporting a larger and denser tree and shrub community. Habitat type and aspect also influence vegetation composition within the lava flow.

No federal threatened or endangered plant species are known to occur in the area, as indicated by the U.S. Fish and Wildlife Service. One state plant of special concern (Rock Spleenwort Asplenium resiliens) is found within the Malpais. Habitat for this fern appears to be restricted to moist sinkholes.

Vegetative characteristics of the WSA's are summarized in the following table which indicates Standard Habitat Site classifications. Standard Habitat Sites (SHS) generally apply to broad areas with delineations based on similarities of vegetation and land form. This classification system is used for wildlife habitat management purposes.

Standard Habitat Site (SHS)	Approximate % Composition of WSA
Juniper-Mixed Shrub/Malpais	55
Mixed Shrub/Malpais	39
Grass-Mixed Shrub/Limestone Hills	6

Most of the Juniper-Mixed Shrub SHS is found in the northern WSA, starting about 1-1/2 miles north of U.S. 380. This SHS is indicated by the presence of a sparse overstory of one-seed juniper. The Mixed Shrub SHS occurs in both WSA's, but the majority of this site is within the southern WSA. The Grass-Mixed Shrub SHS borders the lower western side of the lava flow in the southern WSA.

E. Wildlife and Threatened or Endangered Species

Human visitation into the central portion of the WSA's is largely curtailed by the forbidding nature of the terrain, thus providing a haven for game animals. The difficulties presented in extracting killed game from the flow interior limits most hunters and trappers to hunting within a short distance from the perimeter. Repeated aerial reconnaissance flights have consistently shown that the predominance of big game sightings are within a quarter to a half mile from the periphery. This fact, when considered with the abundance of available browse, makes it apparent that the absence of water within the confines of the flow is probably the main limiting factor in game distribution.

The lava flow supports a sizeable herd of mule deer yearlong. In addition, a small band of barbary sheep has been observed during three seasons (summer, fall and winter) indicating yearlong residency. Predator species inhabiting or regularly visiting the flow include coyotes, kit foxes, gray foxes, bobcats, and ringtail cats. Historical sightings of mountain lions either passing through or staying for a time have been recorded. Also, reportedly, a black bear inhabited the flow until it was removed by hunters.

The diversity of bird species in the lava flow is high when compared to the adjacent grass uplands and limestone hills. Several woodland and scrubland birds inhabit the area yearlong or seasonally.

Included in this list are vireos, warblers, jays, sparrows, and shrikes. Turkey vultures along with great horned owls concentrate in the flow for breeding and nesting. During the winter months, both golden and bald eagles can be seen hunting over the lava or resting within. Heavy use by raptors (birds of prey) is evidenced by the sightings of numerous whitewashed crags and ledges visible from the air.

An unusual characteristic exhibited by some of the smaller animals inhabiting the lava flow is that they have developed a melanistic, or darker, fur or skin coloration than is typical for their species. This coloration is believed to be an effective protective mechanism that camouflages animals residing within the dark colored lava flow. The presence of melanistic animals was noted by biologists as early as 1927 and several new rodent subspecies were first collected in this lava flow during the 1930's. Additional details about research activities appear in Chapter III.F. of this report. There are twelve animal species - six rodents, five lizards and one snake - residing within the WSA that have developed melanistic races. Individuals within these races exhibit a high degree of variability in melanistic character ranging from near normal to very dark coloration. The white-throated wood rat is unique in that it has developed melanistic races in this area; melanistic races of this particular species are not known to occur on other lava flows in New Mexico.

The bald eagle, a Federally listed endangered species, has been observed near the periphery of the flow. The black hawk, listed as a State endangered (Group II) species, may occasionally occur in the vicinity of the flow although no sightings have been recorded. No delineations of crucial habitat in the WSA's for threatened or endangered wildlife species have been made by the U.S. Fish and Wildlife Service.

F. Visual Resources

Visual quality of the WSA's has been evaluated in accordance with BLM's Visual Resource Management (VRM) system, which is described in the Bureau's 8400 manual series. This two part system includes both the inventory of existing scenic qualities and the assignment of management goals that are needed to minimize visual impacts.

The Carrizozo Lava Flow, which includes both WSA's, was rated as high scenic quality when compared with other land areas in this physiographic region. Also, since this rating area is visible from a major travel route, user sensitivity to visual modifications was rated as high. The striking color contrast between black lava rock and the brown to gray surrounding landscape is the most important factor contributing to the high scenic value of this area. Inventory findings indicated the lava flow portion of the WSA's should be managed in accordance with VRM Class II goals. Portions of the WSA's outside the lava flow have lower scenic quality and management in accordance with less stringent VRM Class III goals is indicated.

G. Cultural Resources

The perimeter of the flow on both WSA s is characterized by grassy fingers or inlets which extend into the flow body. On a seasonal basis, water may be available along the edges in catchments and intermittent playas; however, no permanent springs, seeps, or other waters have been located within the WSA boundaries. The lack of permanent waters along with the ruggedness of the terrain may have prevented extensive human habitation other than occasional visits. Flakes, scrapers, broken points, and various tools were located along the periphery although such findings were infrequent and scarce. Caves, ledges, and protective overhangs examined for evidence of use uncovered no artifacts; however, local residents have indicated extensive pothunting occurred in past years.

Prior to the construction of Highway 380 which bisects the WSA s, the northern edge of the flow was utilized as a rest stop along the old stagecoach route. According to local residents, a well (probably a deep catchment) existed within the interior of the northern edge and was used to draw and haul water to the stage horses. The ruins of at least four abandoned homesteads or line shacks are located in the malpais, generally within a few hundred feet of the edge. Constructed of lava rock foundations, the ruins are in varying stages of deterioration. Roofing materials include both lumber and tin with nearby corrals constructed of posts and wire or lava rock walls. Associated dumps indicate the age of the ruins to vary from the late 1880's through the mid 1930's.

H. Air

No air quality data is available for this area. However, the air quality is considered to be good since there are no major sources of air pollution in the area. During windy periods, especially in the spring, there is a significant amount of wind-borne dust and soil in the air.

III. EXISTING AND POTENTIAL USES

A. Mineral Development

Leasable Minerals

Several sources of information were considered in order to determine the potential for development of oil and gas resources. The WSAs have been classified as prospectively valuable for oil and gas by the U.S. Minerals Management Service (MMS). An industry source, Atlantic Richfield Company, rated the northern WSA as having high intermediate favorability and the southern WSA as low intermediate favorability for oil and gas resources. Both WSAs have been rated as having low favorability in the GEM assessment based on indirect evidence. One well drilled on the western edge of Little Black Peak WSA encountered a show of oil in the San Andres Formation. Three exploration wells were located about one mile east of the lava flow and two are known to have shows of oil and gas. Two wells have been drilled several miles west of the lava flow - one well had a show of oil and gas while the other well was a dry hole. As of April 1982, 80% of federal oil and gas acreage in the WSAs had either been leased or applications were pending. The interest in leasing and the number of wells that contained shows of oil or gas seemed to indicate that this portion of the Tularosa Basin had a potential for hydrocarbon resources. However, based upon current leasing records (June 1984) about 30% of the total WSAs' acreage is covered by parts of 11 leases. Approximatly 20% of the northern WSA and 50% of the southern WSA is under lease. This decline in leasing interest appears to indicate a reduced interest in exploration for potential hydrocarbon resources. Whether or not there are any economic reserves of hydrocarbons underlying the WSAs is a question that can only be confirmed or denied through additional exploration.

All leases for federal minerals within the WSAs were processed after passage of the Federal Land Policy and Management Act (FLPMA) and lease operations are subject to regulation to protect wilderness values. A wilderness protection stipulation on these post-FLPMA leases seriously constrains potential exploration activities in rocky areas since allowable activities must be temporary and must be reclaimed to a substantially unnoticeable condition.

There is a low potential for other lower value leasable mineral resources in the WSA, based upon indirect evidence. Salt is known to occur in the Yeso Formation. This formation is exposed in the southern WSA and a thick salt sequence was encountered in a nearby oil exploration hole. Potential development of this resource, if it is confirmed to exist in the southern WSA, would be limited since the reserves are probably covered by considerable amounts of overburden. Geothermal potential has been rated as low favorability based on indirect evidence - the presence of recent basalts. The MMS has not classified geothermal potential for the WSAs, nor have there been any leases or applications.

Locatable Minerals

Currently, there are no exploration or development activities for locatable minerals taking place in the WSAs. Twenty-two mining claims were recently in effect within the northern WSA on the large kipuka in Sections 9 and 10, T. 7 S., R. 10 E. During the summer of 1980 several exploratory holes were drilled on the claims but no information is available from these tests. Uranium claims had been located on the kipuka in the mid-1950's but have since been abandoned. Current BLM mining claim records (June 1984) do not indicate the presence of any claims within both WSAs.

Due to the presence of an exposure of intrusive rocks in the northern WSA (the eastern part of the kipuka in Section 9 and 10, T. 7 S., R. 10 E.), this location has been rated as having a low potential for the accumulation of; hydrothermal gold, silver, copper, lead, porphyry molybdenum-copper and uranium. According to available information, both the mid-1950 and more recent mining claims at this site were targeted for uranium only. There is a low potential for stratabound copper-silver deposits in the Yeso Formation along the southwestern margin of the southern WSA. Uranium deposits in San Andres limestone along the western border of the lava flow and at the Tertiary intrusive are a low potential in both WSAs. There is a low potential for replacement deposits of iron to occur in both WSAs where sedimentary rocks have been intruded by igneous rocks. Magnetite has been found in similar situations in areas several miles north of the WSAs.

There is low favorability for the occurrence of hydrothermal fluorite and barite associated with the small Tertiary intrusive in the northern WSA. Gypsum is present in the Permian Yeso and San Andres Formations and subsurface deposits are known to occur on the western margin of both WSAs. Gypsum was mined from the San Andres Formation in the Jicarilla Mountains northeast of Little Black Peak WSA in the early 1900's, but production in the Jicarilla area ceased due to unfavorable economic conditions.

Salable Minerals

There currently are no active material sales within the WSAs, but scoria was sold from 1964 to 1972 at a location on the east side of Carrizozo Lava Flow WSA (Section 31, T. 7 S., R. 10 E.). This extraction site was excluded from the WSA boundary due to the substantially noticeable nature of the intrusion.

Scoria, basalt, sandstone and limestone from the WSAs could potentially be sold for landscaping and building material use, dependent upon local public demand or the availability of external market areas. This potential use is reduced by the availability of adequate supplies at nearby alternative source areas where materials are currently being extracted.

There is a low favorability for sand and gravel accumulations in about 300 acres of alluvial deposits in the southwestern corner of the southern WSA. Use of this potential resource would be limited by the distance to population centers and lack of legal access to potential deposits.

B. Watershed

The lava flow is in a stable erosion condition class due to its rocky nature which serves as an excellent water trap for surface precipitation and external drainages. The remaining soils which occur around the edges of the lava flow are in the slight erosion condition class. Due to the good watershed conditions, no management activities are proposed for the purpose of enhancing water resources.

C. Livestock Grazing

Cattle use occurs only on a small area within the boundaries of both WSAs. Appreciable use occurs only on the limestone hills and alluvial plain on the west side of the Carrizozo Lava Flow WSA, accessible kipukas and grassy inlets bordering the lava flow elsewhere. Livestock, with the exception of goats, are unable or refuse to travel any distance in the lava due to rugged terrain and lack of water sources. In the past, two livestock operators, the Crockett Ranch (now Schrecengost) and the Harkey ranch grazed goats in the lava. Both ranchers had to sell the goats when their herders quit and couldn't be replaced. Goats were last licensed on the Crockett Ranch in 1964 and federal land within the lava flow was removed from the allotment in 1965. Federal land in the former Harkey Ranch has not been included in a grazing allotment since 1965. All other ranchers indicated in 1965 that they had no desire to graze goats in the lava flow area, however, they retain their original grazing adjudication which may allow them to change class of livestock from cattle to goats. This constitutes a potential grazing use in both WSAs. No range improvements have been proposed inside either WSA.

Decisions on livestock grazing methods, class of livestock and carrying capacities are not within the scope of this study document since these matters are normally decided as part of the land use planning process.

Information concerning existing and potential livestock grazing appears on the following Table III-1.

TABLE III-1: LIVESTOCK GRAZING IN THE CARRIZOZO LAVA FLOW AND LITTLE BLACK PEAK WSAs

Name	Allot. Number	WSA	Acres in WSA	AUM's[a] in WSA Existing	Potential
Schrecengost	3076	CLF[b]	1429[c]	230	0
Carl Johnson	3077	LBP[d]	4412	e	508
Bar W Ranch	3080	LBP	2398	e	540
		CLF	1207	e	432
Gallacher Ranches	0367[f]	LBP	100	e	23

Source: Grazing case files.

a. An AUM (Animal Unit Month) is the amount of forage necessary for the sustenance of one cow or its equivalent for 1 month.
b. Carrizozo Lava Flow W S A
c. Includes only land outside of lava flow but within W S A
d. Little Black Peak W S A
e. Not calculated
f. Gallacher Ranches is under administration of BLM Socorro District.

D. Recreation

Recreation resources in these units are quite diverse. Currently both areas are receiving increasing hunting pressure for deer and quail. The flow contains a moderate deer population (est. 3 per section); the area is popular because of stories of some extremely large deer being taken in the flow. The recent discovery of a small herd of Barbary sheep in the flow will probably add to this area's popularity.

The unique plant, animal and geological features found at the flow attract many visitors each year. There is no visitor use data for either of the two WSAs, but information is available for Valley of the Fires State Park located between the WSAs. A five-year average visitation at Valley of the Fires State Park is 48,000, but has been known to reach over 75,000 visits in a single year. This park, with its campground, toilets, etc., is an excellent place for visitors to set up camp and visit the surrounding lava fields within the two study areas. This park also has a "Malpais Nature Trail" which explains the flora, fauna and geologic features of this unique lava flow.

Other recreational uses in the lava flow are hiking, bird watching, nature study and spelunking. Hikers and weekend naturalists find the lava field interesting because of the availability of diverse plant and animal communities, visual attractiveness and challenging terrain with sinkholes and caves. The majority of the visitors park along Highway 380 and walk into the study areas.

The potential use of this area has never been realized primarily because of a lack of adequate access, limited parking space next to Highway 380 and widespread lack of knowledge of the area by the public. Rights-of-way for the public on private roads could provide better recreation access. Future plans for Highway 380 involve enlarging the roadway. Construction on this highway would present the opportunity to construct more pullouts and increase recreational use. Valley of the Fires State Park is helping to make the public aware of the flow and its recreation potential.

E. Education/Research

The Carrizozo Malpais has been an important locale for scientific study by biologists, botanists and geologists since the late 1920's and some research activities are taking place at the present time.

Early biological explorers first described flora and fauna of the lava flow in connection with more extensive surveys in the Tularosa Basin. The reported presence of melanistic (dark colored) races of small animals sparked the interest of other researchers in this particular lava flow. Scientists on an expedition sponsored by the University of Michigan in 1927 reported the discovery of a very light-colored pocket mouse at White Sands and a dark-colored pocket mouse in the nearby lava beds (Dice 1930). The relationship between animal and habitat coloration was believed to be the result of isolation and natural selection, but no conclusive evidence was obtained to confirm or deny this theory (Benson 1933). L. M. Shields (1956; 1957) described vegetation of the lava flow and conducted studies concerning the role of lichens and algae in nitrogen formation in volcanic soils. Dr. S. E. Reichert of the University of Tennessee is presently conducting a behavioral and energetics study on a species of spider that inhabits the flow (Personal Communication 1982). Geologists have analyzed the mineral composition of the lava and studied flow formation processes.

Geological guidebooks with descriptions of the lava flow are available to provide an educational opportunity for visitors. The "Malpais Nature Trail" at Valley of Fires State Park provides an educational experience for park visitors and students from nearby schools. In addition to existing educational uses, information gained from scientific studies may enhance future educational values of the WSAs.

F. Realty Actions

There are no existing rights-of-way, withdrawals, easements or permits on public lands within the boundaries of either WSA; the WSA boundaries are located 50 feet on either side of the U.S. Highway 380 centerline.

The only known potential realty action in the WSAs would be in the immediate vicinity of the U.S. Highway 380 corridor. The New Mexico State Highway Engineer has indicated that the lava flow segment of U.S. 380 needs reconstruction and a right-of-way should be acquired. Long-term potential needs for highway purposes in this area are estimated to affect no more than a 300 foot wide corridor of public lands.

G. Military Use of Airspace

The United States Air Force currently uses airspace either directly above or in the immediate vicinity of both WSAs for airborne tactical training maneuvers. This use normally consists of flights at elevations below 10,000 feet at speeds in excess of 250 knots. Some high speed flights occur at 500 to 1500 feet above ground level.

At the time this report was prepared there were parts of three military training routes and one restricted area overlying the WSAs. However, training routes are periodically modified or deleted to introduce route variation and prevent pilots from memorizing a particular course of travel. It is possible that at different times airspace above the WSAs may not be within any training route.

The Air Force has indicated that continued use of airspace above the WSAs is essential to their operational and training missions.

IV. WILDERNESS CRITERIA

A. Evaluation of Wilderness Values

1. Quality of Mandatory Wilderness Characteristics

a. Naturalness

The imprint of man's work is very limited within the boundary of both WSAs. Two major factors which contribute to the generally natural appearance of these WSAs are: (1) the lack of exploitable resources and presence of rugged terrain within the lava flow has prevented most of man's activities; and (2) areas containing significant manmade intrusions were excluded from the study area boundaries during the inventory process.

Imprints of man that are known to be within the current boundaries for both WSAs are described as follows and depicted on the accompanying map:

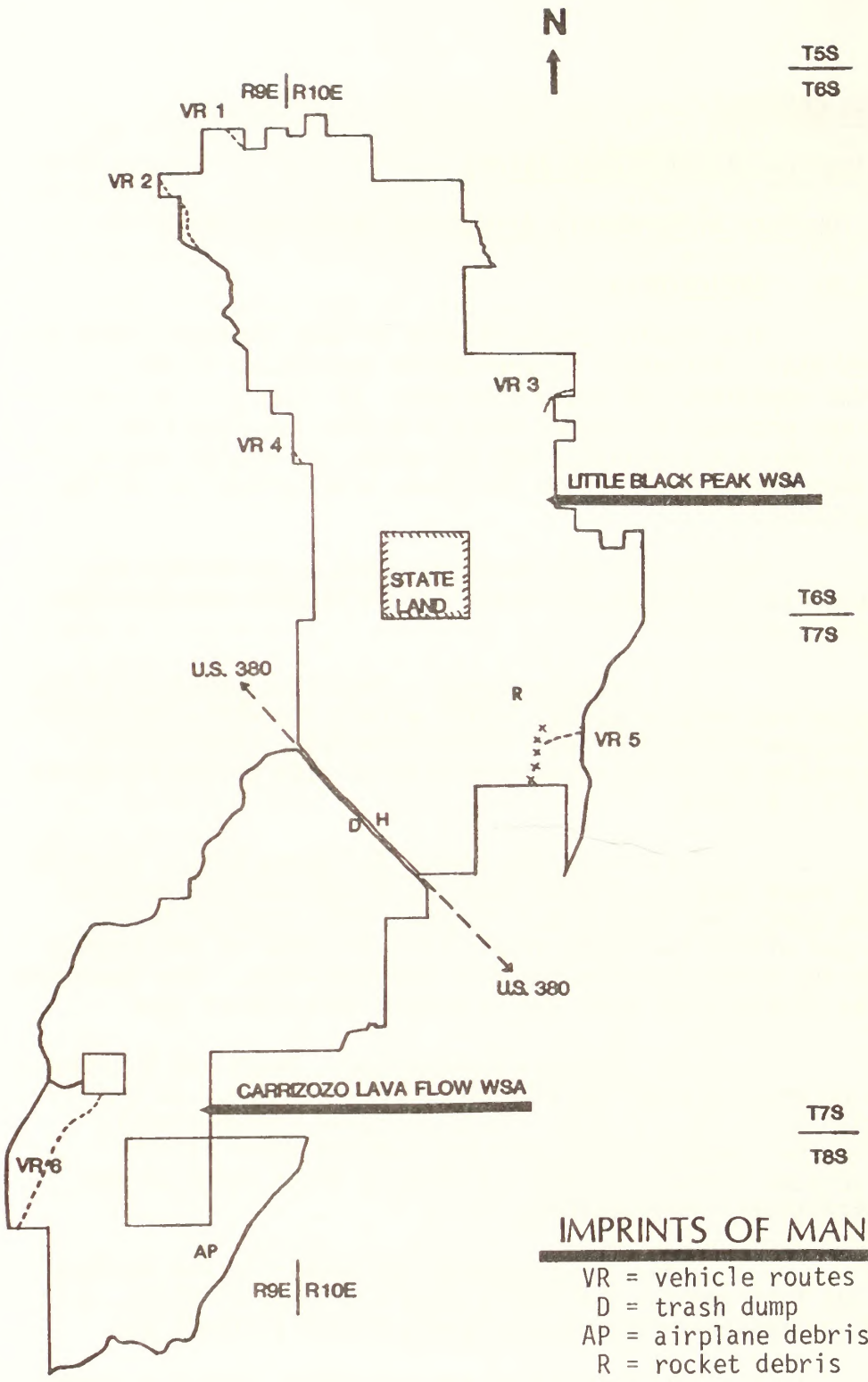
(1) Vehicle Routes - There are portions of six low-standard motorized vehicle access routes within the WSA's boundaries, with most routes paralleling the edge of the lava flow. One vehicle route provides access across less than 1/4 mile of lava to the kipuka in Section 9, T. 7 S., R. 10 E.

(2) U.S. 380 Travel Influence Zone - There is an unauthorized trash dump, scattered roadside litter and some painted graffiti on lava rocks that border U.S. Highway 380. Some of these minor imprints are within the study areas since the edge of the highway right-of-way is the north or south boundary for both WSAs. One abandoned homestead in the Little Black Peak WSA is within this travel zone.

(3) Mineral Exploration - There are 5 prospect trenches, some of which are 40' long by 20' wide by 8' deep, on the kipuka in Section 9, T. 7S., R. 10E. These trenches are noticeable within the kipuka but natural vegetation has reduced their offsite noticeability to some extent. Recent exploratory drill holes on the kipuka are substantially unnoticeable.

(4) Miscellaneous Imprints - In the southern WSA there are the tail section and debris from a wrecked airplane, and the debris from a wrecked rocket or missile is in the northern WSA.

The individual and cumulative effect of human imprints within the WSAs has not significantly impaired their natural character. The minor imprints that are present near the lava flow edge are easily removed from view by traveling a short distance inside the lava which has excellent topographic screening qualities. Due to the location of these imprints near the WSA's external boundaries, it would be possible to exclude imprinted areas from a wilderness recommendation. The screening effects of topography also minimize the influence of outside sights and sounds of highway traffic upon the naturalness characteristic.



IMPRINTS OF MAN IN WSA's :

VR = vehicle routes (1 through 6)
D = trash dump
AP = airplane debris
R = rocket debris
H = abandoned homestead
X = mineral prospect pits

SCALE; one-half inch = one mile

The apparent high quality naturalness of these WSAs would be readily perceived by the average visitor. In fact, the naturalness of the relatively undisturbed ecosystem inside the lava flow is one of the distinguishing wilderness qualities for both WSAs. Evidences of man are so dispersed and limited that an average visitor would be led to believe they were the first human to set foot on or observe most areas in the lava flow.

b. Solitude

The rough and broken surface of the lava flow provides an outstanding opportunity for visitors to find solitude. Topographic features such as pressure ridges, fissures and depressions allow visitors to be screened from one another and from impacts outside the area such as vehicles on U.S. Highway 380. The relatively large size and generally desirable configuration of both WSAs and the presence of a scattered overstory of juniper trees, which are more abundant in the northern WSA, also enhance solitude. Other factors that contribute to solitude opportunities in the WSAs consist of limited legal accessibility for the general public, the lack of water sources needed to support unconfined recreation and low levels of visitor use. These factors are expected to influence solitude opportunities in the WSAs during the foreseeable future.

Portions of the WSAs outside the lava flow do not provide as high a quality setting for solitude. This reduced quality is especially noticeable in the alluvial plains on the southwestern edge of the southern WSA which lack topographic and vegetation screening. An intermittently occupied dwelling on private land borders this portion of the WSA.

The sound of vehicles on U.S. Highway 380 would detract, in varying degrees, from solitude on WSA lands bordering this travel route. Noise impacts would vary according to the proximity of visitors to the highway and upon the availability of screening topography that would reduce noise levels. This localized impact is not expected to diminish the solitude that is characteristic of the WSAs since users would still be able to find a secluded spot. High noise levels generated by low flying military aircraft that use airspace above the WSAs for training missions would intermittently diminish solitude opportunities. Visitors would not be able to avoid this short duration and infrequent noise impact. However, this activity is not considered to be a barrier to wilderness designation since there are designated wilderness areas that are subject to similar uses.

The undesirable configuration of a narrow peninsula of WSA land in Section 15, T. 7 S., R. 10 E. does not contribute to an outstanding opportunity for solitude. This portion of the WSA varies from about 100 feet to 1600 feet wide, and is bordered by state and private land on three sides. Visitors would have difficulty in finding

a secluded spot within this portion of the WSA if adjacent lands are devoted to nonwilderness uses. Opportunities for solitude could be improved if bordering state and private lands in the lava flow were acquired by BLM and managed to protect wilderness values.

Although there are some factors that detract from solitude opportunities in the WSAs, their cumulative impact is not considered as being great. The overall quality of this wilderness characteristic is rated as high.

c. Recreation

Opportunities for primitive and unconfined types of recreation in the WSAs consist of hunting, hiking, nature study, spelunking, photography and dispersed sightseeing activities that focus on cultural, geological, botanical and zoological resources. The intricately broken surface of the lava flow portion of the WSAs is an effective barrier to motorized vehicle use. This physical quality enhances opportunities for primitive recreation experiences.

The unavailability of water sources inside the WSAs and poorly distributed legal access routes limits the potential for dispersed recreation uses. Visitor activities would be confined to the range that carried water supplies would permit a person to travel. Therefore, opportunities for dispersed use are greatest in the central portion of the WSAs and most limited at the northern and southern ends. The absence of a multitude of landforms, well defined travel routes and points of interest in the WSAs may detract from some people's perception of recreation qualities. People that expect those qualities in a wilderness area would not be intrigued by the opportunities these WSAs offer.

Overall, the quality of recreation opportunities in both WSAs is rated as moderate.

2. Special Features

The diversity of vegetation, presence of melanistic forms of wildlife, availability of unusual geological features such as caves and volcanic landforms, and the scenic qualities of the recent lava flow constitute the special features of this WSA.

3. Multiple Resource Benefits

Resource values and uses in the WSAs that would be perpetuated through wilderness designation and protective management include wildlife habitat and associated species, cultural values, watershed, nonmotorized recreational activities and scenic values.

Congressional designation as wilderness would carry the weight of law and would provide a greater degree of long term protection for natural values than would the administrative designations available to the Bureau.

A more detailed discussion of multiple resource benefits that would be afforded by wilderness designation appears in the impact analysis for the all wilderness alternative in Chapter VI.A. of this report.

4. Diversity

a. Ecosystems Present

Use of the Bailey-Kuchler classification system has been selected by BLM to ensure nationwide consistency in evaluating this diversity criteria. According to the Bailey-Kuchler system, both WSAs are located within the Colorado Plateau Province and have Juniper-pinon woodland potential natural vegetation.

b. Distance To Population Centers

The WSAs are within 5 hours driving time from the following Standard Metropolitan Statistical Areas - Albuquerque, New Mexico and both El Paso and Lubbock in Texas.

B. Manageability

In order for the WSAs to be recommended as suitable for wilderness designation they must be capable of being managed over the long run to preserve wilderness character. Manageability of an area is determined based upon an evaluation of provisions contained in BLM's Wilderness Management Policy (WMP). The following manageability factors were determined to potentially affect the ability of the BLM to preserve wilderness character: topography, State inholdings, and a potential realty action.

A small portion of the WSAs that lacks a lava rock surface has gentler topography and is susceptible to activities such as motorized vehicle use which could conflict with wilderness management. Areas with gentle terrain are found in grassy coves and surrounding plains on the northern boundary of Little Black Peak WSA, and the alluvial plains/ limestone hills in the southwestern part of Carrizozo Lava Flow WSA. There are no natural barriers to prevent conflicting uses on the alluvial plains near Crockett's Ranch, and non-conforming activities could occur in drainages within the limestone hills. Manageability of lands that lack natural barriers to exclude incompatible uses is further complicated by the remote location and limited accessibility of those portions of the WSAs. The WSAs are located near the periphery of the BLM adminis-

trative boundary, about two hours driving time from the managing office, and therefore are not as easy to inspect as closer areas. Although the lack of legal access to the northern and southern ends of the WSAs has not presented a manageability problem, future problems could arise if access for management purposes is denied in those areas.

The State inholding in Little Black Peak WSA (Section 32, T. 6 S., R. 10 E.) is potentially subject to exploration for oil and gas resources because this land has been leased. It is probable that potential use of State lands would occur prior to the lease expiration date in June 1991. Exploration activities are more likely to occur on State lands since there are no restrictions to protect wilderness values, as is the case on surrounding federal lands. Although it is difficult to predict what exploration method would take place, it is assumed that in the most extreme case, road access would be needed across WSA lands in Section 31, T. 6 S., R. 10 E. A road within that section would cause localized impacts to wilderness values but would not significantly affect manageability of the surrounding WSA.

Two State sections are located on the east boundary of the Carrizozo Lava Flow WSA. Section 36, T. 7 S., R. 9 E., has been leased for oil and gas development while Section 2, T. 8 S., R. 9 E. is open for leasing. At the present time road access could be provided to Section 36 across federal lands that are outside of the WSA in Section 31, T. 7 S., R. 10 E. However, if road access is ever needed to Section 2, the shortest route would be across WSA lands in Section 1, T. 8 S., R. 9 E. Depending upon the construction methods, routing and type of materials used for a road, this non-conforming use would have a localized effect but would not significantly affect manageability of the surrounding WSA.

Based on existing information the BLM is not reasonably certain that development of mineral leases on State lands will occur in the WSA which would necessitate changes to improve manageability of the WSAs. Also, since these potential manageability conflicts would have localized effects on wilderness character and since similar nonconforming activities are allowed by the 1964 Wilderness Act in designated wilderness areas, boundary modifications are not needed.

The potential right-of-way expansion and reconstruction work on U.S. Highway 380, in addition to the concentrated imprints of man along this travel route, impairs wilderness manageability in contiguous portions of both WSAs. Present and potential activities are reasonably certain to destroy wilderness character in the affected area, but a boundary adjustment could prevent manageability problems.

Manageability would be enhanced if all vehicle routes (shown on the intrusion map) were either closed to vehicles or deleted from the recommended wilderness boundaries.

Manageability of the WSAs as wilderness would be enhanced through acquisition of one State inholding in Little Black Peak WSA and other unimpaired lands state and private lands within the lava flow that border both WSAs. This potential enhancement measure, conducted through a voluntary exchange or purchase program, would be conducted with the goal of acquiring non-federal lands that would form valuable additions to a designated wilderness. If the WSAs are designated as wilderness, a land consolidation program would reduce problems associated with providing adequate access to inholdings and would allow for consistent management of
the lava flow landform. Irregular ownership patterns along the edge of the lava would be improved and a wilderness boundary that coincides with a recognizable landform could result. Potential acquisitions include 5 State sections and various parts of the lava flow in private ownership.

V. PUBLIC INVOLVEMENT OVERVIEW

This report was prepared after considering information and comments provided by the public. Public views concerning BLM's wilderness recommendation for these WSAs will continue to be requested and considered during later stages of the wilderness study process.

Public comments regarding the identification and selection of these areas for wilderness study were requested in 1979 and 1980 during the inventory phase of BLM's wilderness review program. However, unsolicited public interest in this area was expressed prior to the start of inventory work. A comment in a nationally distributed 1978 magazine article recommended the Carrizozo Malpais as a candidate for wilderness designation since it was notable as one of the most recent lava flows in the western United States.

During the public comment period on wilderness study area proposals, individual comments and petitions concerning both WSAs were received by BLM. Most of the individual comments and all petitions favored wilderness study for these areas. Most people indicated that wilderness characteristics were present, although some people did not offer supporting reasons for their recommendation. Comments opposing wilderness study cited as supporting reasons: the presence of range, road and mining impacts; noise impacts from traffic on nearby highways and aircraft overhead; and potential problems with access to state land.

Public comments received since completion of the inventory phase described existing and potential resource uses. One comment opposed wilderness designation due to mineral resource conflicts. Local, state and federal agencies have been requested to identify problems that wilderness designation would have with their plans, policies or regulations. The only significant issues identified by the public were surrounded state trust land, highway use and military training use of airspace.

During the public comment period on the Draft EA a total of 40 public comments were received on the Carrizozo Lava Flow and Little Black Peak WSAs. 27 of the 40 commentators supported wilderness designation of the WSAs and most respondents agreed with the Amended Boundary preferred alternative. The remainder of supportive comments preferred the All Wilderness alternative, offered no opinion on wilderness boundaries, or proposed acreage increases or decreases. 5 commentators opposed wilderness designation, primarily on the basis of potential mineral resource conflicts. 8 commentators did not offer opinions for or against wilderness designation or made diverse technical comments on specific parts of the BLM assessment.

Two commentators questioned the mineral resource information which BLM used to evaluate potential resource uses and impacts.

One commentator questioned deletion of a mineralized area with moderate favorability for silver/copper/gold in the southern part of Carrizozo Lava Flow WSA. No data was provided to support that rating and the location was not described. The GEM assessment assigned a low favorability for copper/silver/gold mineralization in both WSAs. Due to the low favorability ratings it was determined by BLM that boundary modifications were not needed to resolve potential resource conflicts. The same commentator also requested a boundary adjustment to exclude 22 mining claims and the mineral exploration area in Little Black Peak WSA. All mining claims have been abandoned in this WSA since the draft environmental assessment was prepared in March 1983, which appears to corroborate the low mineral favorability rating used by BLM.

The other mineral commentator disagreed with mineral favorability ratings for oil and gas resources in Little Black Peak WSA. The GEM assessment assigned a low favorability rating based on indirect evidence. It was noted that more exploration may be necessary to determine if there is oil and gas present. The mineral commentator had previously rated this WSA as having high intermediate favorability for oil and gas based upon the presence of a "number" of geologic characteristics. The GEM assessment considered the geologic environment, inferred geologic processes, and reported mineral occurrences or production records prior to arriving at a favorability rating. Due to the absence of extensive subsurface exploration and lack of seismic information the true potential for oil and gas resources cannot be accurately predicted at this time.

Since mineral favorability ratings are determined using available information, which is subject to varying interpretations, BLM will consider additional mineral resource information prior to making a final wilderness suitability recommendation for these WSAs. A joint mineral survey will be conducted on these WSAs in the near future by the U.S. Geological Survey and Bureau of Mines. The results of this survey will be considered by the BLM Director in arriving at recommendations on wilderness suitability. Any additional mineral resource information that the public or minerals industry may be able to provide concerning these WSAs will be accepted and considered by BLM during later phases of the study process.

VI. ALTERNATIVES AND IMPACTS

There would be no significant effects under any of the management alternatives considered in this report to the following resources and uses in both WSAs; geology, water, soils, air, existing livestock grazing, existing rights-of-way and airspace use. For this reason, no impact analysis is presented in subsequent parts of this chapter on these subjects.

A. All Wilderness

Under this alternative, the entire 25,312 acres of public lands in both WSAs would be recommended as suitable for wilderness designation (see map on page I-3 for a description of the WSAs boundaries). If designated wilderness, the existing uses and activities in the area and potential uses identified in Chapter III would be managed under the constraints of the Wilderness Management Policy (WMP). WMP constraints are reflected in impact discussions, although these constraints may not be specifically described.

Under the All Wilderness Alternative, the impacts to expansion of U.S. Highway 380 would be significant. The impacts to wilderness values would also be significant because of the added protection of Congressional designation. The impacts to minerals, vegetation, wildlife, visual resources, cultural resources, potential livestock grazing, recreation, and education/research activities are not considered significant. However, these impacts are discussed because of public interest and perceptions and to display the full range of impacts. Impacts to resource values and uses that are not discussed because they are clearly insignificant are listed in the first paragraph at the top of this page.

1. Impacts to Minerals

It is assumed that all mineral resources would be withdrawn from appropriation, and Congress would not establish special provisions for mineral exploration or development within the designated wilderness.

There is no existing use of known mineral resources in both WSAs, but potential uses could be affected by wilderness designation. Salable minerals - namely scoria basalt and suitable materials for crushed rock, would not be available for use. However, there are alternate sources in the immediate vicinity of the WSAs where demands for salable minerals could be met. Future demands for these construction materials are not expected to change appreciably from the current situation because resources are not close to a large population center and large-scale construction projects are not anticipated. Unavailability of salable minerals would be a minor long-term impact.

Impure deposits of gypsum, another construction material that would be excluded from development, would be slightly impacted under this alternative since other factors, such as mineral purity and inaccessibility, have a greater influence upon potential use of this mineral.

The extent of other mineral values in the WSAs is not completely known since resource potentials are inferred, which makes it difficult to predict actual impacts. It is assumed that wilderness designation would have a slight effect upon use of other minerals since there is a low favorability for their development in the WSAs, as pointed out in the GEM assessment. Most mineral commodities, with the exception of oil and gas, could be found only in small portions of the WSAs, such as intrusive or sedimentary rocks. Since these minerals are only inferred to be present in the WSAs and no discoveries have been made, wilderness designation would preclude exploration under the mining and mineral leasing laws to determine if resources actually exist.

Based on existing information, wilderness designation would have a low degree of conflict with mineral resource development and impacts would not be significant.

2. Impacts to Other Resources and Uses

a. Vegetation

Potential impacts to vegetation under this alternative would be reduced because surface disturbing activities such as oil and gas exploration, motorized vehicle use, material sales, and mining would be prevented. Potential grazing activities could be constrained since they would be conducted in a manner that would protect wilderness values such as naturally-appearing vegetation and wildlife habitat. Due to the ruggedness of the Malpais, existing grazing use affects a small area and oil and gas exploration in the area has not shown promise, therefore, vegetation would remain much the same as it is now. Motorized vehicle use on about 4 miles of existing trails could be prohibited in most cases, allowing for establishment of new vegetation in limited areas. Impacts to vegetation would not be significant.

b. Wildlife

Potential impacts to wildlife habitat due to actions such as road building or scoria removal would be avoided. Wildlife improvements would be limited to actions consistent with preserving the wilderness integrity. Hunting, trapping, birdwatching, and similar wildlife-related activities would be expected to remain at about the same level. Impacts to wildlife would not be significant.

c. Visual

Maximum protection of visual resources in the WSAs would occur under this alternative since all public lands would be managed to preserve their natural character (VRM Class I). Management activities would be limited to those actions which do not attract attention. Scenic qualities of the lava flow landform and bordering areas would not be completely protected by this alternative since incompatible activities could still take place on non-federal lands. There would be on-site visual degradation of federal lands if access roads are constructed to state lands inside the lava flow. Impacts to visual resources would not be significant.

d. Cultural

Limited opportunities for surface disturbance under wilderness designation would provide maximum protection for cultural and historical resources. Increased visitation which could result from the attention created by wilderness designation could result in more human disturbance of cultural values. Impacts to cultural resources would not be significant.

e. Livestock Grazing

Potential use by goats of presently ungrazed areas would be managed to prevent conflicts with wilderness values, such as plant communities and wildlife habitat. Range improvements, if needed, would be constructed only for improved management of livestock or for resource protection, and not for the purpose of increasing herd sizes. Generally, motorized access on existing trails would not be permitted. However, if there were no practical alternatives, permits for vehicle use could be issued to livestock permittees. Impacts to livestock grazing would not be significant.

f. Recreation

The all wilderness alternative would have an insignificant impact on recreation activities in both areas. The lava flow blocks vehicular access, so ORV use would not be affected. Increased attention due to wilderness designation may contribute to increased recreation use.

g. Education/Research

The all wilderness alternative would provide protection, from adverse actions which may impact some of the natural systems related to the flow. The lava flow ecosystem is the highpoint of educational and research pursuits in this area. Impacts to these uses would not be significant.

h. Realty Actions

Potential expansion in the width of U.S. Highway 380 would be precluded by this alternative. The highway right-of-way would remain at 100 feet wide and future activities would be confined to that corridor. Denial of highway expansion to improve safety and meet demands for increased traffic could be highly controversial and would result in a significant impact.

i. Wilderness Values

Wilderness designation would provide for long-term protection of wilderness values on all lands inside the WSAs, as mandated by Congress. Existing imprints of man would be rehabilitated to substantially unnoticeable conditions and vehicle routes would be closed to motorized use.

Manageability problems, identified in Chapter IV.B., would not be remedied and more administrative work would be needed to ensure protection of the designated wilderness.

Reasonable access to state lands could be allowed, but would be regulated to minimize impacts to wilderness values. Future mining claims located prior to wilderness designation could be patented, but surface rights would not be conveyed to the claimant. BLM could regulate surface uses on patented mining claims, to minimize impacts to the wilderness resource, and surface uses that were not reasonably required for mining operations would not be allowed. Under this alternative, the impacts on wilderness values could be significant.

B. Amended Boundary

Under this alternative, boundary adjustments would exclude approximately 1,063 acres from a wilderness recommendation. Boundary adjustments would remove lands with lower quality wilderness characteristics, remove a significant conflict, and enhance manageability of the remaining area. Boundary adjustments consist of removing relatively flat and open terrain bordering the lava flow, a narrow finger of lava bordered by non-public lands, and WSA lands paralleling U.S. Highway 380. The amended boundary alternative is depicted on Map 1 on page I-3 of this report.

This alternative would not cause a significant impact to potential realty actions since expansion of U.S. Highway 380 could be allowed; for this reason, this resource use is not mentioned in the following impact discussions. Impacts to wilderness values would be the only significant impact under this alternative.

1. Impacts to Minerals

Impacts would be similar to those described for the all wilderness alternative except that a small area in the southwest corner of the WSAs would be available for mineral exploration and development. About 590 acres of alluvial plains and Yeso Formation, which has a geological environment where several mineral resources could be found, would be open to mineral activities under this alternative. Other boundary adjustments, along the edge of the lava flow, would allow for mineral exploration to occur on land that would be protected in the all wilderness alternative. Impacts to minerals would not be significant under this alternative, and would be similar to the insignificant impacts described for the first alternative.

2. Impacts to Other Resources and Uses

a. Vegetation, Livestock Grazing and Education/Research

Impacts are not considered to be significant and would be similar to those described for the all wilderness alternative. A slight change in impacts would occur since most existing vehicle trails would remain open to motorized access, except for a trail 0.2 miles long that extends west from the lava flow edge to the large kipuka in Little Black Peak WSA. Revegation of 3.8 miles of trails would not occur under this alternative.

b. Wildlife

Impacts to wildlife under this alternative could result from potential habitat loss in non-wilderness portions of the WSAs due to surface disturbing activities. New Mexico Highway Department policy requires the fencing of highway rights-of-way when new construction or major maintenance is performed. New construction or major maintenance could not be performed under the all wilderness alternative, but could be allowed by this alternative. It is assumed that fencing of the U.S. Highway 380 right-of-way, would occur under this alternative. Construction of a highway fence along the amended boundary could affect movement of the resident mule deer and barbary sheep herds. With proper mitigating measures (underpasses, etc.), which BLM could require as a condition of the right-of-way grant, this impact could be reduced to a minor level over the long-term or eliminated by not allowing fence construction. Impacts to wildlife would not be significant under this alternative if proper mitigation measures are taken.

c. Visual

Portions of the WSAs that have the highest scenic quality would be protected through this alternative. All other impacts would be similar to those discussed in the all wilderness alternative,

except that visual qualities could be slightly degraded in a small area bordering Highway 380. It is assumed that reconstruction of Highway 380 would not cause a significant impact to scenic qualities since mitigation measures that minimize the extent of visual impacts would be employed.

d. Cultural

Potential damage to known and undiscovered cultural sites could occur due to ORV or vehicular travel around the perimeter of the flow. Vandalism to historical sites could increase with additional visitation around the edge of the lava flow. No significant impacts would occur due to this alternative.

e. Recreation

The impact to recreation activities would be similar to the all wilderness alternative with two exceptions. The amended boundary along Highway 380 would allow for upgrading of the roadway and highway improvement with pullouts could provide for additional parking which would increase roadside visitation in both areas. Also, 3.8 of the 4.0 miles of existing trails would be left open to recreational vehicle use. Impacts to recreation would not be significant.

f. Wilderness Values

Under this alternative, wilderness values in the most manageable part of the WSA would be protected through long-term Congressional designation, which is a significant impact. Management of WSA lands excluded under this alternative would be subject to normal multiple use practices and non-wilderness activities could be allowed on lands that are contiguous with a wilderness boundary. However, minimization of impacts in the contiguous wilderness area would be a primary management concern, and the rugged topography inside the designated wilderness would prevent encroachment of nonconforming uses. Therefore external impacts would probably not have a significant effect upon nearby wilderness values. All other impacts are similar to those described for the all wilderness alternative.

C. No Action

This alternative describes the impacts to wilderness values and other resources that would occur if the WSAs are not designated as wilderness and existing resource uses are continued. The only constraints that would apply to resource utilization would be physical and economic limitations. There would be no special form of management to conserve or protect resource values except for actions mandated by law, policy, rule or regulation. Future surface disturbing activities, such as material sales and exploration on mineral leases, would probably be confined to the periphery of the lava flow as they have in the past.

The rugged terrain in this landform would continue to present a natural barrier to most uses. The lack of Congressional protection and potential for loss of wilderness values would be a significant impact under this alternative.

This alternative would not affect potential livestock grazing nor cause an impact to realty actions. For this reason, there is no impact discussion in the following analysis.

1. Impacts to Wilderness Values

Under the no action alternative there would be no long-term special protection accorded to wilderness values.

Material sales and mineral exploration along the periphery of the lava flow would cause localized degradation of wilderness values. The additional cost of construction for exploration in this rugged terrain would minimize the extent of future impacts. During the foreseeable future, wilderness values in the central part of the lava flow are expected to remain unaffected by man's activities because of the protective topography. Wilderness values in less rugged portions of the WSAs are more susceptible to change and could potentially be lost due to the impact of future land alterations.

Nonconforming uses (access to state lands and development of mining claims) would be regulated only to prevent unnecessary and undue degredation of federal lands. Impacts to wilderness values would not be considered when allowing these uses and there would be a greater effect upon the wilderness resource under this alternative. Also, patents that include both surface and mineral rights could be issued on future mining claims; wilderness resources would be lost on developed areas and solitude could be degraded on adjacent areas. Impacts would be significant because of this alternative.

2. Impacts to Other Resources and Uses

a. Mineral Development

Mineral impacts would be similar to the first two alternatives except that wilderness protection would not have an influence on resource development. Under this alternative mineral leasing, location and sales activities would not be restricted or regulated in order to protect wilderness values. It is assumed that although mineral exploration or development would be allowed under this alternative, there would be a gradual long-term increase in use that would be moderated by physical and economic limitations. Impacts to mineral development would not be significant.

b. Vegetation

This alternative would allow for potential degradation of the vegetative resource. Surface disturbing activities could remove vegetation and potential livestock grazing could alter the natural diversity of vegetation since there would be no special protection for this wilderness resource. Livestock grazing could reduce the diversity and density of plant species. Vegetation would be eradicated in areas where material sales occur. Access routes for oil and gas exploration would open more areas to cattle use and consequently affect vegetation. Impacts to vegetation would not be significant.

c. Wildlife

Impacts under this alternative would be similar to the amended boundary alternative except that a gradual long-term increase in surface disturbing activities could occur. This would create a moderate but insignificant impact during periods of actual disturbance and a minor impact in the long-term.

d. Visual

Visual resources would be managed under less stringent VRM Class II and III goals. Modifications that could be seen but would not attract attention would be allowed in Class II areas, which would include the lava flow landform. Alluvial plains, limestone hills and grassland bordering the lava would be managed as Class III areas. Modifications that begin to attract attention could be allowed in Class III areas under this alternative. Future visual modifications would probably take place on the periphery of the lava flow as they have in the past. The rugged topography in the central part of the flow would preclude most impairing activities and visual qualities in that area would be maintained during the foreseeable future.

Administrative protection of visual resources would not be assured under this alternative since BLM managers would have the prerogative to downgrade VRM goals or allow activities to occur that would be inconsistent with more stringent goals. It is estimated that significant impacts to visual resources would not occur under this alternative.

e. Cultural

Cultural resource impacts would be similar to those described for the amended boundary alternative, except that more vandalism could occur since less management attention would be devoted to this land area. Impacts to cultural resources would not be significant.

f. Recreation

Present recreation activities would continue, but may be impaired or destroyed in areas where mineral exploration or surface disturbance takes place. This insignificant impact is not expected to affect primitive recreation opportunities in the majority of the area.

g. Education/Research

Disturbances to natural vegetation, which could potentially happen under this alternative, would affect associated education and research values. This alternative is not believed to present a significant impact to education and research activities.

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